CLAIMS

1. (Previously presented) A reactor assembly comprising:

a base unit;

a chuck assembly disposed in a cavity of the base unit, wherein the chuck assembly comprises a support having a surface capable of receiving a substrate;

a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit;

an inlet manifold assembly in fluid communication with a first sidewall opening of the process chamber in a selected one of the sidewalls, wherein the inlet manifold assembly comprises a flow-shaping portion adapted to laterally elongate a gas and/or a reactant flow into the process chamber, wherein the fluid communication between the inlet manifold assembly and the first sidewall opening of the process chamber is free from a baffle plate; and

an exhaust manifold assembly in fluid communication with a second sidewall opening of the process chamber in the sidewall diametrically opposed from the selected one of the sidewalls.

2. (Original) The reactor assembly according to Claim 1, wherein the flow-shaping portion of the inlet manifold assembly is adapted to introduce the gas and/or reactant flow into the process chamber at about a plane parallel to a surface of the substrate.

3. (Original) The reactor assembly according to Claim 1, wherein the flow-shaping portion is triangularly shaped.

4. (Original) The reactor assembly according to Claim 1, wherein the top wall of the process chamber is removable.

5. (Previously presented) The reactor assembly according to Claim 1, wherein a bottom wall of the base unit is adapted to be stackedly attached to a second reactor assembly.

6. (Original) The reactor assembly according to Claim 1, wherein the exhaust manifold assembly is adapted to receive the gas and/or reactant flow from the process chamber at about a plane parallel to the surface of the substrate.

7. (Original) The reactor assembly according to Claim 1, wherein the exhaust manifold assembly comprises an exhaust receiving portion and a flow restrictor, wherein the flow restrictor is affixed to an opening of the exhaust receiving portion and is adapted to restrict the gas and/or reactant flow through the opening from the process chamber into the exhaust receiving portion.

8. (Original) The reactor assembly according to Claim 1, wherein the support of the chuck assembly comprises a means for regulating a temperature of the substrate.

9. (Original) The reactor assembly according to Claim 1, wherein the support further comprises a resistance heating element and a cooling passage.

10. (Original) The reactor assembly according to Claim 1, wherein the support of the chuck assembly is stationary and non-rotating.

11. (Original) The reactor assembly according to Claim 1, wherein the inlet manifold assembly further comprises a flow restrictor attached to an opening of the flow-shaping portion.

12. (Original) The reactor assembly according to Claim 1, wherein the top wall is substantially transparent to a light source.

13. (Original) The reactor assembly according to Claim 1, wherein the top wall is substantially transparent to a UV light source.

14. (Original) The reactor assembly according to Claim 1, wherein the top wall is substantially transparent to an infrared light source.

15. (Previously presented) The reactor assembly according to Claim 1, wherein the process chamber includes a third sidewall opening in the sidewall adjacent to the first and second sidewall openings, wherein the third opening is sized for transporting the substrate into an interior region of the process chamber.

16. (Original) The reactor assembly according to Claim 1, further comprising a baffle plate disposed about an opening of the flow-shaping portion.

17. (Original) The reactor assembly according to Claim 7, wherein the exhaust receiving portion is triangularly shaped.

18. (Original) The reactor assembly according to Claim 7, wherein the flow restrictor comprises a plate having at least one passageway.

19. (Original) The reactor assembly according to Claim 7, wherein the flow restrictor comprises a rectangularly shaped plate having a length dimension greater than a height dimension, wherein the passageway is disposed in an area less than or equal to about one half of the height dimension.

20. (Original) The reactor assembly according to Claim 7, wherein the flow restrictor comprises anodized aluminum.

21. (Original) The reactor assembly according to Claim 1, wherein the inlet manifold assembly is adapted to introduce the gas and/or reactants at about a plane parallel to a surface of the substrate and the exhaust manifold assembly is adapted to exhaust the gas and/or reactants at about a plane parallel to a surface of the substrate.

22. (Withdrawn) A process for flowing a gas and/or reactive species through a process chamber, the process comprising:

laterally elongating a laminar flow of the gas and/or reactive species into the process chamber at about a plane parallel to a surface of a substrate; and

exhausting the flow of the gas and/or reactive species out of the process chamber at about the plane parallel to the surface of the substrate.

23. (Withdrawn) The process according to Claim 22, wherein exhausting the flow of the gas and/or reactive species further comprises restricting the flow and creating a pressure differential between an interior of the process chamber and an interior of an exhaust receiving portion.

24. (Withdrawn) The process according to Claim 22, wherein exhausting the flow of the gas and/or reactive species further comprises restricting the flow and creating a pressure differential of at least about 50 millitorr between an interior of the process chamber and an interior of an exhaust receiving portion.

25. (Withdrawn) The process according to Claim 22, wherein exhausting the flow of the gas and/or reactive species further comprises restricting the flow and creating a pressure differential of at least about 300 millitorr between an interior of the process chamber and an interior of an exhaust receiving portion.

26. (Withdrawn) The process according to Claim 22, wherein exhausting the flow of the gas and/or reactive species further comprises restricting the flow and creating a pressure differential of at least about 500 millitorr between an interior of the process chamber and an interior of an exhaust receiving portion.

27. (Withdrawn) The process according to Claim 22, further comprising operating the process chamber at a pressure of about 100 millitorr to about 3 torr.

28. (Withdrawn) The process according to Claim 22, wherein laterally elongating the laminar flow comprises minimizing a flow velocity difference between a central region flow velocity and an outer region flow velocity.

29. (Withdrawn) An inlet manifold assembly comprising:

an inlet end portion comprising a cylindrically shaped conduit; and

a flow-shaping portion comprising a first end opening in fluid communication with the inlet end portion and a second end opening, wherein a width of the flow-shaping portion increases from the first end opening to the second end opening and is effective to laterally elongate a fluid flowing from the inlet end portion through the flow-shaping portion.

30. (Withdrawn) The inlet manifold assembly according to Claim 29, wherein the flow-shaping portion comprises a height dimension that decreases from the first end opening to the second end opening.

31. (Withdrawn) The inlet manifold assembly according to Claim 29, further comprising a baffle plate affixed to a recess about the second opening.

32. (Previously presented) A reactor assembly comprising:

a base unit;

a chuck assembly disposed in a cavity of the base unit, wherein the chuck assembly comprises a support having a surface capable of receiving a substrate;

a process chamber comprising a transparent top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to top the wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit;

a light source assembly in operable communication with the transparent top wall for projecting radiation into the process chamber;

an inlet manifold assembly in fluid communication with a first sidewall opening of the process chamber in a selected one of the sidewalls, wherein the inlet manifold assembly comprises a flow-shaping portion adapted to laterally elongate a gas and/or a reactant flow into the process chamber, wherein the fluid communication between the inlet manifold assembly and the first sidewall opening of the process chamber is free from a baffle plate; and

an exhaust manifold assembly in fluid communication with a second sidewall opening of the process chamber in the sidewall diametrically opposed from the selected one of the sidewalls.

33. (Previously presented) The reactor assembly of Claim 32, wherein the light source assembly comprises a housing and a light source.

34. (Original) The reactor assembly of Claim 32, wherein the top wall comprises a quartz material.

35. (Original) The reactor assembly of Claim 32, wherein the exhaust manifold assembly is adapted to receive the gas and/or reactant flow from the process chamber at about a plane parallel to a surface of the substrate.

36. (Original) The reactor assembly of Claim 32, wherein the transparent top wall is removable.